

SEARCH REQUEST FORM

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Requester's Full Name: DAWN GARRETT Examiner #: 76107 Date: 5/22/2003
 Art Unit: 1774 Phone Number 30 5-0788 Serial Number: 10/025,634
 Mail Box and Bldg/Room Location: CP3 8B32 Results Format Preferred (circle) PAPER DISK E-MAIL

(Mailbox at 11D03)

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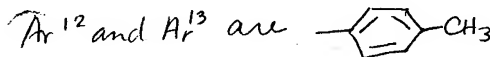
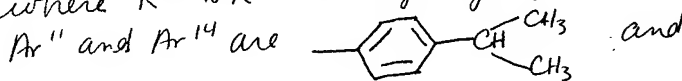
 Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: ORGANIC ELECTROLUMINESCENCE DEVICEInventors (please provide full names): TAKASHI ARAKANE, XENICHI FUKUOKA, CHISHIO HOSOKAWAEarliest Priority Filing Date: (JAPAN2000-394152) 12/26/2000

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Please search an organic electroluminescent device comprising:
hole transporting material according to compound 1

and specific compound (1) formula (10)
 where $R^{4'}$ to $R^{4''}$ are hydrogen,



AND
electron transporting material according to compound 5
and specific compound 5 formula (5-a)

See attached formulas.

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Type of Search

NA Sequence (#) _____ STN \$ 321.71
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transporting compound in the area of recombination. Light is emitted by recombination of the holes and the electrons. Since injection of holes into the electron transporting compound is suppressed, degradation of the electron transporting compound is suppressed and the life of the device is extended. The hole transporting compound can also provide durability to the electron injection.

[0013] It is preferable that the ionization energy of the hole transporting compound represented by IP1 and the ionization energy of the electron transporting compound represented by IP2 satisfy the relation: $IP1 \leq IP2$.

[0014] Due to this relation, holes are more easily injected into the lowest occupied orbital of the hole transporting compound from an outer layer of the light emitting medium. The outer layer means a layer other than the layer of the light emitting medium such as the anode, a hole injecting layer, a hole transporting layer and a buffer layer.

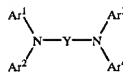
[0015] It is preferable that the electron affinity of the hole transporting compound represented by Af1 and the electron affinity of the electron transporting compound represented by Af2 satisfy a relation: $Af1 \leq Af2$. The electron affinities represented by Af1 and Af2 are values of the energies of the lowest vacant orbitals based on the energy level of an electron in the vacuum as the reference. Due to this relation, electrons are more easily injected into the lowest vacant orbital of the electron transporting compound from an outer layer of the layer of the light emitting medium. The outer layer means a layer other than the layer of the light emitting medium such as the cathode, an electron injecting layer, an electron transporting layer, a hole arresting layer or a buffer layer. In this case, it is preferable that ΔEv given by $\Delta Ev = IP2 - IP1$ and ΔEc given by $\Delta Ec = Af2 - Af1$ satisfy a relation: $\Delta Ev \geq \Delta Ec$. Due to this relation, electrons are more easily injected into the lowest vacant orbital of the hole transporting compound through the electron transporting compound. On the other hand, injection of holes into the lowest vacant orbital of the electron injecting compound is suppressed.

[0016] The electron affinity of the hole transporting compound represented by Af1 and the electron affinity of the electron transporting compound represented by Af2 may satisfy a relation: $Af1 > Af2$. In this case, the hole transporting compound does not substantially transport electrons or the mobility of electrons with the hole transporting compound is smaller than the mobility of electrons with the electron transporting compound. In this the mobility of electrons with the electron transporting compound. In this case, it is preferable that ΔE_v given by $\Delta E_v = IP2 - IP1$ and $\Delta E_c'$ given by $\Delta E_c' = Af1 - Af2$ satisfy a relation: $\Delta E_v \geq \Delta E_c'$. Due to this relation, the trapping effect of the hole transporting compound decreases and electrons transported with the electron transporting compound can more easily reach the area of recombination.

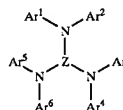
[0017] It is preferable that the hole transporting compound used in the organic EL device of the present invention is an aromatic amine having a condensed cyclic structure.

[0018] It is preferable that the aromatic amine is represented by the following general formula (1):

SOLE TRANSPORTING MATERIAL COMPOUND!



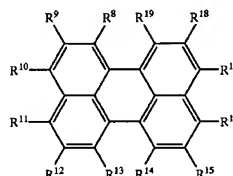
[0019] wherein Ar¹ to Ar⁴ each independently represent a substituted or unsubstituted aromatic hydrocarbon group, having 6 to 40 carbon atoms or a substituted or unsubstituted aromatic heterocyclic group having 3 to 40 carbon atoms, Y₁ represents a substituted or unsubstituted aromatic residue group having 2 to 60 carbon atoms, at least one of the groups represented by Ar¹ to Ar⁴ and Y₁ has a condensed cyclic group having 3 or more rings and a substituent in the groups represented by Ar¹ to Ar⁴ and Y₁ may form a ring with two groups selected from the groups represented by Ar¹ to Ar⁴ and Y₁, or by the following general formula (2):



[0020] wherein Ar¹ to Ar⁶ each independently represent a substituted or unsubstituted aromatic hydrocarbon group having 6 to 40 carbon atoms or a substituted or unsubstituted aromatic heterocyclic group having 3 to 40 carbon atoms, Z represents a substituted or unsubstituted aromatic residue group having 3 to 60 carbon atoms, at least one of the groups represented by Ar¹ to Ar⁶ and Z has a condensed cyclic group having 3 or more rings and a substituent in the groups represented by Ar¹ to Ar⁶ and Z may form a ring with two groups selected from the groups represented by Ar¹ to Ar⁶ and Z.

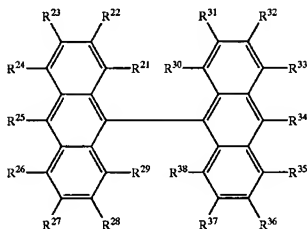
[0021] In the above general formulae (1) and (2), examples of the groups represented by Ar¹ to Ar⁶, Y and Z include aromatic residue groups derived from anthracene, chrysene, fluorene, pyrene, perylene, naphthalene, pentacene, coronene, fluoranthene, pycene, rubicene and acenaphthofluoranthene.

[0022] It is preferable that the compounds represented by general formulae (1) and (2) are compounds represented by any of the following general formulae (7) to (11).



[0023] In the above general formula (7), R⁸ to R¹⁹ each independently represent hydrogen atom, a halogen atom, hydroxyl group, a substituted or unsubstituted amino group,

nitro group, cyano group, a substituted or unsubstituted alkyl group having 1 to 30 carbon atoms, a substituted or unsubstituted alkenyl group having 2 to 30 carbon atoms, a substituted or unsubstituted cycloalkyl group having 5 to 30 carbon atoms, a substituted or unsubstituted alkoxy group having 1 to 30 carbon atoms, a substituted or unsubstituted aromatic hydrocarbon group having 6 to 40 carbon atoms, a substituted or unsubstituted aromatic heterocyclic group having 3 to 40 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 40 carbon atoms, a substituted or unsubstituted aryloxy group having 6 to 40 carbon atoms, a substituted or unsubstituted alkoxy carbonyl group having 2 to 40 carbon atoms or carboxyl group. Two groups selected from the groups represented by R^8 to R^{19} may form a ring and at least one of the groups represented by R^8 to R^{19} is a diarylamino group represented by $-NAr^7Ar^8$, Ar^7 and Ar^8 each independently represent a substituted or unsubstituted aryl group having 6 to 20 carbon atoms.

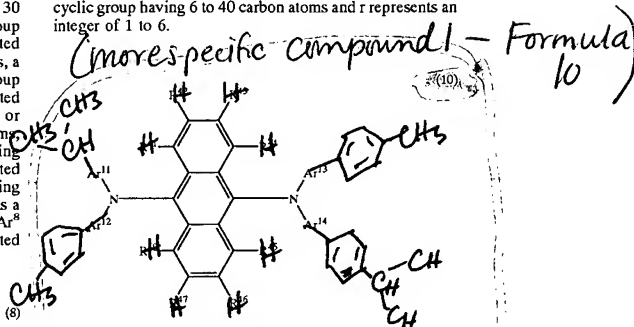


[0024] In the above general formula (8), R^{21} to R^{38} each independently represent hydrogen atom, a halogen atom, hydroxyl group, a substituted or unsubstituted amino group, nitro group, cyano group, a substituted or unsubstituted alkyl group having 1 to 30 carbon atoms, a substituted or unsubstituted alkenyl group having 2 to 30 carbon atoms, a substituted or unsubstituted cycloalkyl group having 5 to 30 carbon atoms, a substituted or unsubstituted alkoxy group having 1 to 30 carbon atoms, a substituted or unsubstituted aromatic hydrocarbon group having 6 to 40 carbon atoms, a substituted or unsubstituted aromatic heterocyclic group having 3 to 40 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 40 carbon atoms, a substituted or unsubstituted aryloxy group having 6 to 40 carbon atoms, a substituted or unsubstituted alkoxy carbonyl group having 2 to 40 carbon atoms or carboxyl group. Two groups selected from the groups represented by R^{21} to R^{38} may form a ring and at least one of the groups represented by R^{21} to R^{38} is a diarylamino group represented by $-NAr^7Ar^8$, Ar^7 and Ar^8 each independently represent a substituted or unsubstituted aryl group having 6 to 20 carbon atoms.

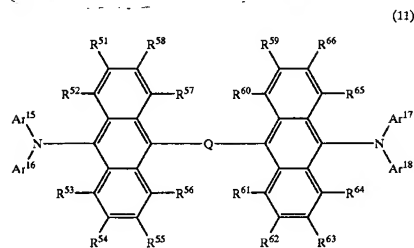


[0025] In the above general formula (9), Te represents a terylene residue group, Ar^9 and Ar^{10} each independently

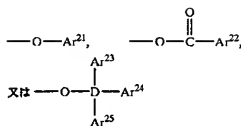
represent a substituted or unsubstituted alkyl group having 1 to 30 carbon atoms, a substituted or unsubstituted monocyclic group or a substituted or unsubstituted condensed polycyclic group having 6 to 40 carbon atoms and r represents an integer of 1 to 6.



[0026] In the above general formula (10), Ar^{11} to Ar^{14} each independently represent a substituted or unsubstituted aryl group having 6 to 16 carbon atoms and R^{41} to R^{48} each independently represent hydrogen atom, a halogen atom, hydroxyl group, a substituted or unsubstituted amino group, nitro group, cyano group, a substituted or unsubstituted alkyl group having 1 to 30 carbon atoms, a substituted or unsubstituted alkenyl group having 2 to 30 carbon atoms, a substituted or unsubstituted cycloalkyl group having 5 to 30 carbon atoms, a substituted or unsubstituted alkoxy group having 1 to 30 carbon atoms, a substituted or unsubstituted aromatic hydrocarbon group having 6 to 40 carbon atoms, a substituted or unsubstituted aromatic heterocyclic group having 3 to 40 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 40 carbon atoms, a substituted or unsubstituted aryloxy group having 6 to 40 carbon atoms, a substituted or unsubstituted alkoxy carbonyl group having 2 to 40 carbon atoms or carboxyl group and two groups selected from the groups represented by R^{41} to R^{48} may form a ring.



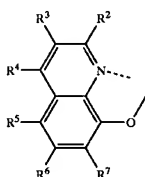
[0027] In the above general formula (11), Ar^{15} to Ar^{18} each independently represent a substituted or unsubstituted alkyl group having 1 to 30 carbon atoms, a substituted or unsubstituted monocyclic group, a substituted or unsubstituted condensed polycyclic group having 8 to 40 carbon atoms; an integral combination of Ar^{15} and Ar^{16} and an integral com-



[0051] In the above formulae, D represents an atom selected from Si, Ge and Sn and Ar²¹ to Ar²⁵ each independently represent an aromatic hydrocarbon group or an aromatic heterocyclic group which may have substituents.

[0052] Further examples of the ligands represented by A and A' include benzoazoles such as derivatives of benzimidazole, benzothiazole and benzoxazole.

[0053] Among the above ligands having a nitrogen atom which are represented by A and A', ligands represented by the following general formula (4) are preferable:



(4)

[0054] wherein R² to R⁷ each independently represent hydrogen atom, a halogen atom, hydroxyl group, a substituted or unsubstituted amino group, nitro group, cyano group, a substituted or unsubstituted alkyl group having 1 to 30 carbon atoms, a substituted or unsubstituted alkenyl group having 2 to 30 carbon atoms, a substituted or unsubstituted cycloalkyl group having 5 to 30 carbon atoms, a substituted or unsubstituted alkoxy group having 1 to 30 carbon atoms, a substituted or unsubstituted aromatic hydrocarbon group having 6 to 40 carbon atoms, a substituted or unsubstituted aromatic heterocyclic group having 3 to 40 carbon atoms, a substituted or unsubstituted aralkyl group having 7 to 40 carbon atoms, a substituted or unsubstituted aryloxy group having 6 to 40 carbon atoms, a substituted or unsubstituted alkoxy carbonyl group having 2 to 40 carbon atoms or carboxyl group and two groups selected from the groups represented by R² to R⁷ may form a ring.

[0055] Examples of the complex having ligands having a nitrogen atom as the complex having a nitrogen atom include complexes having ligands having a nitrogen atom which are derived from 8-quinolinol or derivative thereof such as tris(8-quinolinolato)aluminum, bis(8-quinolinolato)magnesium, bis(benzo(f)-8-quinolinolato)zinc, bis(2-methyl-8-quinolinolato)aluminum oxide, tris(8-quinolinolato)indium, tris(5-methyl-8-quinolinolato)aluminum, 8-quinolinolato lithium, tris(5-methyl-8-quinolinolato)gallium, bis(5-chloro-8-quinolinolato)calcium, 5,7-dichloro-8-

8-quinolinolatoaluminum, tris(5,7-dibromo-8-hydroxy-quinolinolato)aluminum and poly[zinc(II)-bis(8-hydroxy-5-quinolinyl)methane].

[0056] Examples of the complex having a ligand having a nitrogen atom and a ligand having no nitrogen atoms include bis(2-methyl-8-quinolinolato)(phenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(ortho-cresolato)aluminum(III), bis(2-methyl-8-quinolinolato)(metacresolato)aluminum(III), bis(2-methyl-8-quinolinolato)(para-cresolato)aluminum(III), bis(2-methyl-8-quinolinolato)(ortho-phenylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(meta-phenylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(para-phenylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(2,3-dimethylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(2,6-dimethylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(3,4-dimethylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(3,5-dimethylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(3,5-di-tert-butylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(2,6-diphenylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(2,4,6-triphenylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(2,3,6-trimethylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(2,3,5,6-tetramethylphenolato)aluminum(III), bis(2-methyl-8-quinolinolato)(1-naphtholato)aluminum(III), bis(2-methyl-8-quinolinolato)(2-naphtholato)aluminum(III), bis(2,4-dimethyl-8-quinolinolato)(ortho-phenylphenolato)aluminum(I, II), bis(2,4-dimethyl-8-quinolinolato)(para-phenylphenolato)aluminum(III), bis(2,4-dimethyl-8-quinolinolato)(meta-phenylphenolato)aluminum(III), bis(2,4-dimethyl-8-quinolinolato)(3,5-dimethylphenolato)aluminum(III), bis(2,4-dimethyl-8-quinolinolato)(3,5-dimethylphenolato)aluminum(III), bis(2-dimethyl-8-quinolinolato)(3,5-di-tert-butylphenolato)aluminum(III), bis(2-methyl-4-ethyl-8-quinolinolato)(para-cresolato)aluminum(III), bis(2-methyl-4-methoxy-8-quinolinolato)(para-phenylphenolato)aluminum(III), bis(2-methyl-5-cyano-8-quinolinolato)(ortho-cresolato)aluminum(III), bis(2-methyl-6-trifluoromethyl-8-quinolinolato)(2-naphtholato)aluminum(III), bis(2-methyl-8-quinolinolato)aluminum(III)-μ-oxo-bis(2-methyl-8-quinolinolato)aluminum(III), bis(2,4-dimethyl-8-quinolinolato)aluminum(III)-μ-oxo-bis(2,4-dimethyl-8-quinolinolato)aluminum(III), bis(4-ethyl-2-methyl-8-quinolinolato)aluminum(III)-μ-oxo-bis(4-ethyl-2-methyl-8-quinolinolato)aluminum(III), bis(2-methyl-4-methoxyquinolinolato)aluminum(III)-μ-oxo-bis(2-methyl-4-methoxyquinolinolato)aluminum(III), bis(5-cyano-2-methyl-8-quinolinolato)aluminum(III)-μ-oxo-bis(5-cyano-2-methyl-8-quinolinolato)aluminum(III) and bis(2-methyl-5-trifluoromethyl-8-quinolinolato)aluminum(III)-μ-oxo-bis(2-methyl-5-trifluoromethyl-8-quinolinolato)aluminum(III).

[0057] The electron transporting compound used in the organic EL device of the present invention may be an anthracene derivative represented by the following general formula (5):

(5)

ELECTRON TRANSPORT
MATERIAL COMPOUND 5

[0058] wherein A^1 and A^2 each independently represent a substituted or unsubstituted monophenylanthryl group or a substituted or unsubstituted diphenylanthryl group and may represent the same group or different groups and L represents a single bond or a divalent bonding group or by the following general formula (6):



[0059] wherein A^a represents a substituted or unsubstituted anthracene residue group and A^3 and A^4 each independently represent a substituted or unsubstituted monovalent condensed aromatic cyclic group having 10 to 40 carbon atoms or a substituted or unsubstituted aryl group having no condensed cyclic structures and having 12 to 40 carbon atoms and may represent the same group or different groups.

[0060] Examples of the substituent in general formulae (5) and (6) include alkyl groups having 1 to 6 carbon atoms, cycloalkyl groups having 3 to 6 carbon atoms, alkoxy groups having 1 to 6 carbon atoms, aryloxy groups having 5 to 18 carbon atoms, aralkyloxy groups having 7 to 18 carbon atoms, amino groups substituted with aryl groups having 5 to 16 carbon atoms, nitro group, cyano group, ester groups having 1 to 6 carbon atoms, halogen atoms and alkenyl groups.

[0061] Examples of the alkyl group having 1 to 6 carbon atoms include methyl group, ethyl group, propyl group, isopropyl group, butyl group, isobutyl group, sec-butyl group, tert-butyl group, various types of pentyl groups and various types of hexyl groups.

[0062] Examples of the cycloalkyl group having 3 to 6 carbon atoms include cyclopropyl group, cyclobutyl group, cyclopentyl group and cyclohexyl group.

[0063] Examples of the alkoxy group having 1 to 6 carbon atoms include methoxyl group, ethoxyl group, propoxyl group, isopropoxyl group, butoxyl group, isobutoxyl group, sec-butoxyl group, tert-butoxyl group, various types of pentyloxy groups and various types of hexyloxy groups.

[0064] Examples of the aryloxy group having 5 to 18 carbon atoms include phenoxy group, tolyloxy group and naphthyloxy group.

[0065] Examples of the aralkyloxy group having 7 to 18 carbon atoms include benzyloxy group, phenetyloxy group and naphthylmethoxy group.

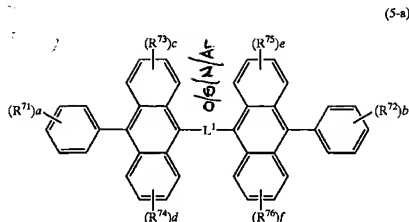
[0066] Examples of the amino group substituted with an aryl group having 5 to 16 carbon atoms include diphenylamino group, ditolylamino group, dinaphthylamino group and naphthylphenylamino group.

[0067] Examples of the ester group having 1 to 6 carbon atoms include methoxycarbonyl group, ethoxycarbonyl group, propoxycarbonyl group and isopropoxycarbonyl group.

[0068] Examples of the halogen atom include fluorine atom, chlorine atom and bromine atom.

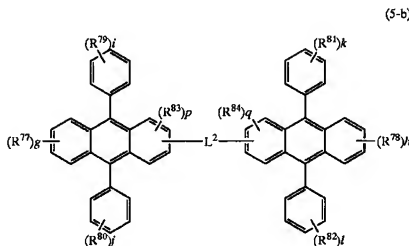
[0069] Examples of the aryl group include styrylphenyl group, styrylbiphenyl group and styrylnaphthyl group.

[0070] Preferable examples of the anthracene derivative represented by general formula (5) include anthracene derivatives represented by general formula (5-a):



[0071] wherein R^{71} to R^{76} each independently represent an alkyl group, a cycloalkyl group, an alkenyl group, a substituted or unsubstituted aryl group, an alkoxy group, an aryloxy group, an alkylamino group, an arylamino group or a substituted or unsubstituted heterocyclic group; a and b each represent an integer of 0 to 5; c, d, e and f each represent an integer of 0 to 4; when any of a to f represents an integer of 2 or greater, a plurality of groups represented by the corresponding R^{71} , R^{72} , R^{73} , R^{74} , R^{75} or R^{76} may be the same with or different from each other and may form a ring by forming a bond between each other; and L^1 represents a single bond, $-O-$, $-S-$, $-N(R)-$ or an arylene group, R representing an alkyl group or a substituted or unsubstituted aryl group; and

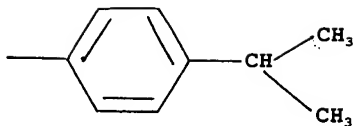
[0072] anthracene derivatives represented by general formula (5-b):



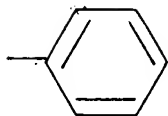
[0073] wherein R^{77} to R^{84} each independently represent an alkyl group, a cycloalkyl group, an alkenyl group, a substituted or unsubstituted aryl group, an alkoxy group, an aryloxy group, an alkylamino group, an arylamino group or a substituted or unsubstituted heterocyclic group; g and h each represent an integer of 0 to 4; i, j, k and l each represent an integer of 0 to 5; p and q each represent an integer of 0 to 3; when any of g to l represents an integer of 2 or greater, a plurality of groups represented by corresponding R^{77} , R^{78} , R^{79} , R^{80} , R^{81} or R^{82} may be the same with or different from each other and may form a ring by forming a bond between each other; and L^2 represents a single bond, $-O-$, $-S-$, $-N(R)-$ or an arylene group, R representing an alkyl group or a substituted or unsubstituted aryl group.

[0074] In the above general formulae (5-a) and (5-b), preferable examples of the groups represented by R^{71} to R^{84}

Ar¹¹ and Ar¹⁴ are

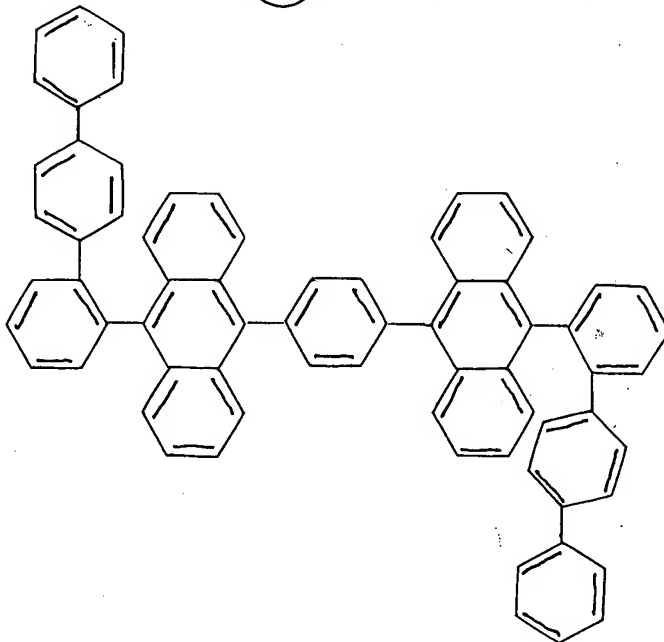


, and Ar¹² and Ar¹³ are



The designated ultimate species of Compound (5) is

a compound within formula (5-a) with the structure



Claims 1 to 6, 8, 11, and 13 to 18 read on the elected species.

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TOTAL DEP.	16
TOTAL CLAIMS	10

TOTAL IND.	2
TOTAL DEP.	16
TOTAL CLAIMS	10

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L5 271 S L1 AND L2 FUL
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L6 4 S L3

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L17 124 S L13
L18 7 S L16 AND L17

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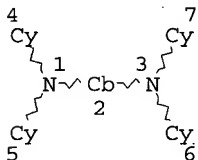
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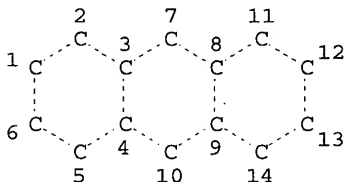
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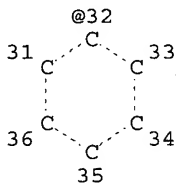
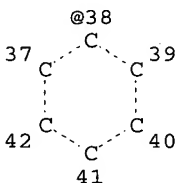
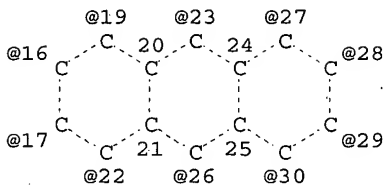
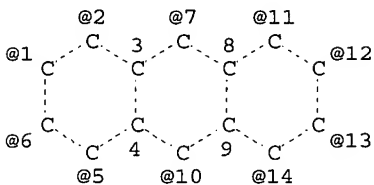
L5 271 SEA FILE=REGISTRY SSS FUL L1 AND L2

100.0% PROCESSED 202922 ITERATIONS

271 ANSWERS

SEARCH TIME: 00.00.05

=> d l13 que stat
L3 STR



VPA 38-7/11/12/13/14/10/5/6/1/2 U
VPA 32-23/27/28/29/30/26/22/17/16/19 U
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 40

STEREO ATTRIBUTES: NONE
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L13 328 SEA FILE=REGISTRY SUB=L10 SSS FUL L3

100.0% PROCESSED 2416 ITERATIONS 328 ANSWERS
SEARCH TIME: 00.00.02

=> file zcaplus
FILE 'ZCAPLUS' ENTERED AT 10:59:03 ON 28 MAY 2003
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
COPYRIGHT (C) 2003 AMERICAN CHEMICAL SOCIETY (ACS)

=> d l22 1-6 ibib abs hitstr hitrn

L22 ANSWER 1 OF 6 ZCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2002:247051 ZCAPLUS

DOCUMENT NUMBER: 136:286307

TITLE: Naphthacene derivatives, organic electroluminescent devices and materials using them

INVENTOR(S): Kanno, Masaki; Suda, Yasumasa; Onikubo, Shunichi

PATENT ASSIGNEE(S): Toyo Ink Mfg. Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 39 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

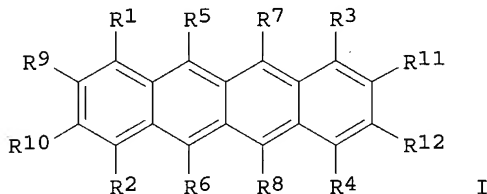
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2002097465	A2	20020402	JP 2000-289680	20000925
PRIORITY APPLN. INFO.:			JP 2000-289680	20000925
OTHER SOURCE(S):		MARPAT 136:286307		

GI



AB The invention relates to an org. electroluminescent device comprising a general formula I [R1-12 = H, halo, or (un)substituted org. residue groups selected from alkyl, aryl, alkoxy, aryloxy, alkylthio, arylthio, amino and heterocycllyl; adjacent substituents of R1-12 may form a ring; .gtoreq.7 R1-12 are (un)substituted aryl; R1-4 can not be H simultaneously].

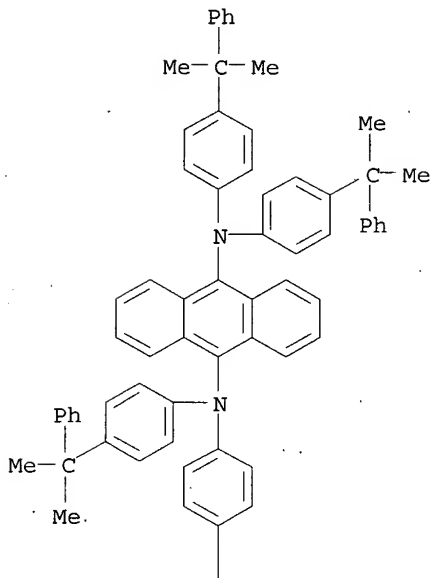
IT 177799-15-4

(naphthacene derivs., org. electroluminescent devices and materials using them)

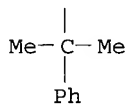
RN 177799-15-4 ZCAPLUS

CN 9,10-Anthracenediamine, N,N,N',N'-tetrakis[4-(1-methyl-1-phenylethyl)phenyl]- (9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 2-A

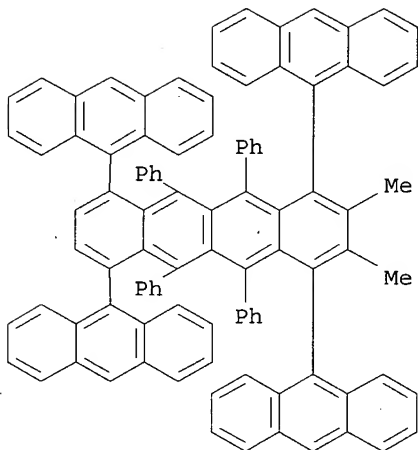


IT 405881-70-1P 405881-87-0P

(naphthalene derivs., org. electroluminescent devices and materials using them)

RN 405881-70-1 ZCAPLUS

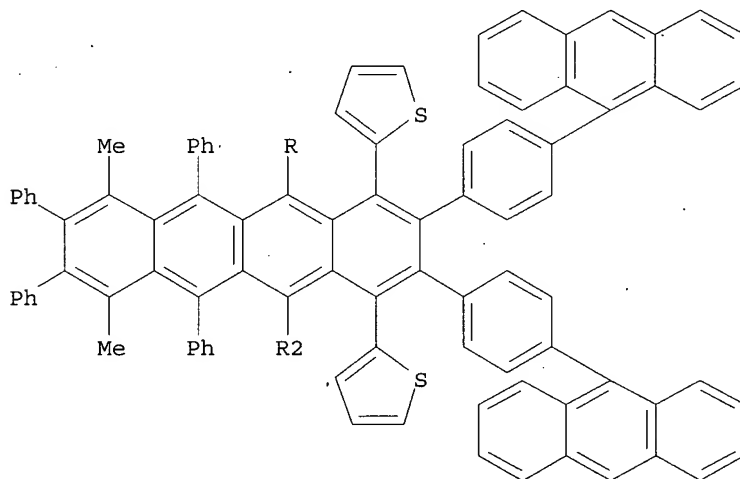
CN Naphthalene, 1,4,7,10-tetra-9-anthracenyl-2,3-dimethyl-5,6,11,12-tetraphenyl- (9CI) (CA INDEX NAME)



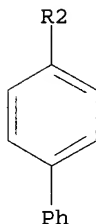
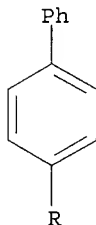
RN 405881-87-0 ZCAPLUS

CN Thiophene, 2,2'-[2,3-bis[4-(9-anthracenyl)phenyl]-5,12-bis([1,1'-biphenyl]-4-yl)-7,10-dimethyl-6,8,9,11-tetraphenyl-1,4-naphthacenediyl]bis- (9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 2-A



IT 177799-15-4
(naphthacene derivs., org. electroluminescent devices and materials using them)
IT 405881-70-1P 405881-87-0P
(naphthacene derivs., org. electroluminescent devices and materials using them)

L22 ANSWER 2 OF 6 ZCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2001:228988 ZCAPLUS

DOCUMENT NUMBER: 134:273305

TITLE: Organic electroluminescence and organic luminous medium

INVENTOR(S): Hosokawa, Chishio; Higashi, Hisahiro; Fukuoka, Kenichi; Ikeda, Hidetsugu

PATENT ASSIGNEE(S): Idemitsu Kosan Co., Ltd., Japan

SOURCE: PCT Int. Appl., 41 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

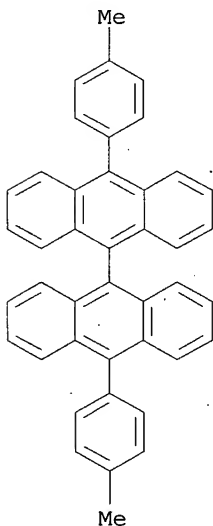
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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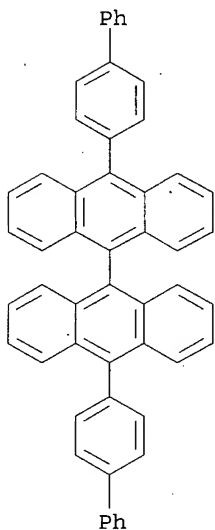
WO 2001021729 A1 20010329 WO 2000-JP6402 20000920
 W: CN, IN, JP, KR
 RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC,
 NL, PT, SE
 EP 1167488 A1 20020102 EP 2000-961101 20000920
 R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,
 PT, IE, FI
 TW 474113 B 20020121 TW 2000-89119391 20000920
 US 6534199 B1 20030318 US 2000-665416 20000920
 PRIORITY APPLN. INFO.: JP 1999-267460 A 19990921
 WO 2000-JP6402 W 20000920

AB The invention refers to a org. electroluminescent device comprising
 a mono-, di- or tri- styryl amine, and at least one of the
 anthracene derivs., A1LA1 [A1,2 = (un)substituted mono Ph anthryl,
 or (un)substituted di-Ph anthryl; L = single bond or divalent chain]
 and A3AnA4 [An = (un)substituted anthracene; A3,4 = (un)substituted
 condensed arom. ring, or (un)substituted C12+ chain uncondensed aryl
 ring].
 IT 172285-76-6 172285-79-9 279672-57-0
 331749-31-6 331749-32-7
 (org. electroluminescence and org. luminous medium)
 RN 172285-76-6 ZCAPLUS
 CN 9,9'-Bianthracene, 10,10'-bis(4-methylphenyl)- (9CI) (CA INDEX
 NAME)

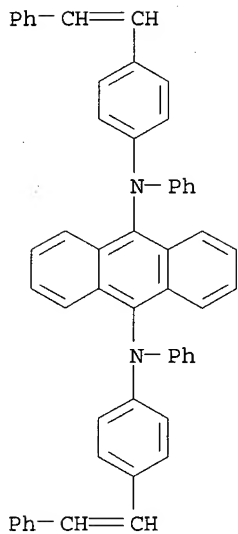


RN 172285-79-9 ZCAPLUS
 CN 9,9'-Bianthracene, 10,10'-bis([1,1'-biphenyl]-4-yl)- (9CI) (CA

INDEX NAME)

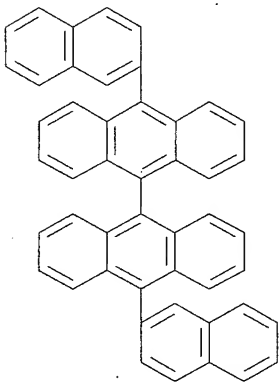


RN 279672-57-0 ZCAPLUS
CN 9,10-Anthracenediamine, N,N'-diphenyl-N,N'-bis[4-(2-phenylethenyl)phenyl]- (9CI) (CA INDEX NAME)



RN 331749-31-6 ZCAPLUS

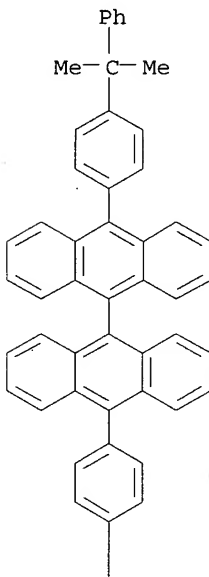
CN 9,9'-Bianthracene, 10,10'-di-2-naphthalenyl- (9CI) (CA INDEX NAME)



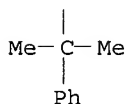
RN 331749-32-7 ZCAPLUS

CN 9,9'-Bianthracene, 10,10'-bis[4-(1-methyl-1-phenylethyl)phenyl]-
(9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 2-A



IT 172285-76-6 172285-79-9 279672-57-0
331749-31-6 331749-32-7

(org. electroluminescence and org. luminous medium)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR
THIS RECORD. ALL CITATIONS AVAILABLE IN
THE RE FORMAT

L22 ANSWER 3 OF 6 ZCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2000:175881 ZCAPLUS

DOCUMENT NUMBER: 132:214645

TITLE: Organic electroluminescence device and
phenylenediamine derivative

INVENTOR(S): Kawamura, Hisayuki; Hosokawa, Chishio

PATENT ASSIGNEE(S): Idemitsu Kosan Co., Ltd., Japan
 SOURCE: PCT Int. Appl., 124 pp.
 CODEN: PIXXD2
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2000014174	A1	20000316	WO 1999-JP4794	19990903
W: CN, KR, US				
RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
EP 1029909	A1	20000823	EP 1999-940653	19990903
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
JP 2000309566	A2	20001107	JP 1999-256280	19990909
US 6541129	B1	20030401	US 2000-530597	20000509
PRIORITY APPLN. INFO.:				
			JP 1998-255563	A 19980909
			JP 1999-47110	A 19990224
			WO 1999-JP4794	W 19990903

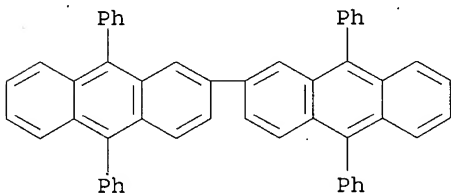
OTHER SOURCE(S): MARPAT 132:214645

AB An org. electroluminescence device having a low driving voltage and a long life and a material having a small ionization potential and providing a large hole mobility are disclosed. The org. electroluminescence device comprises an org. electroluminescent layer contg. a charge injection assisting material, and a hole transport region contg. a phenylenediamine deriv. expressed by a specific structural formula and having a hole mobility of 10-4 cm²/V.cntdot.s or more, the both layer being sandwiched between a pair of electrodes.

IT 172285-72-2 260550-97-8
 (org. electroluminescence device contg. phenylenediamine deriv.)

RN 172285-72-2 ZCAPLUS

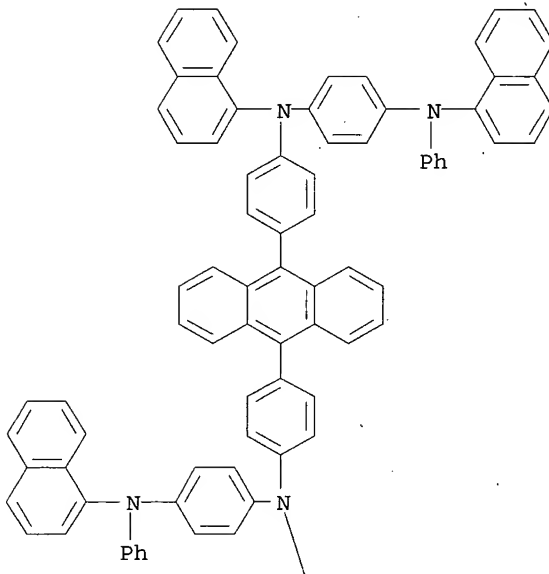
CN 2,2'-Bianthracene, 9,9',10,10'-tetraphenyl- (9CI) (CA INDEX NAME)



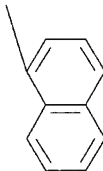
RN 260550-97-8 ZCAPLUS

CN 1,4-Benzenediamine, N,N''-(9,10-anthracenediyl-di-4,1-phenylene)bis[N,N'-di-1-naphthalenyl-N'-phenyl- (9CI) (CA INDEX NAME)

PAGE 1-A

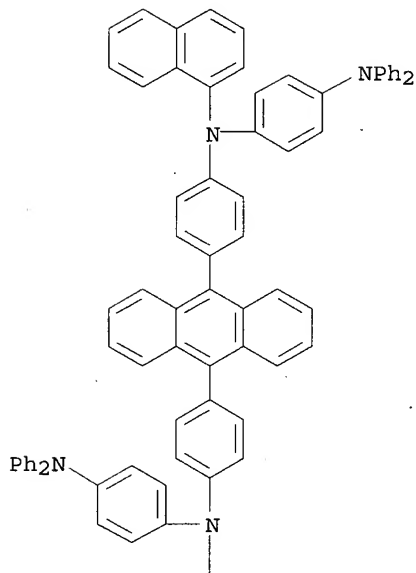


PAGE 2-A

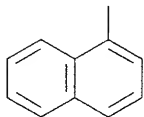


IT 260550-54-7P
(org. electroluminescence device contg. phenylenediamine deriv.)
RN 260550-54-7 ZCAPLUS
CN 1,4-Benzenediamine, N,N'-(9,10-anthracenediyl-di-4,1-phenylene)bis[N-1-naphthalenyl-N',N'-diphenyl- (9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 2-A



IT 172285-72-2 260550-97-8

(org. electroluminescence device contg. phenylenediamine deriv.)

IT 260550-54-7P

(org. electroluminescence device contg. phenylenediamine deriv.)

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE
FOR THIS RECORD. ALL CITATIONS AVAILABLE
IN THE RE FORMAT

L22 ANSWER 4 OF 6 ZCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 2000:85140 ZCAPLUS

DOCUMENT NUMBER: 132:129838

TITLE: Organic electroluminescence device and method of

INVENTOR(S): its manufacture
Higashi, Hisahiro; Sakai, Toshio; Hosokawa,
Chishio
PATENT ASSIGNEE(S): Idemitsu Kosan Co., Ltd., Japan
SOURCE: PCT Int. Appl., 67 pp.
CODEN: PIXXD2
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

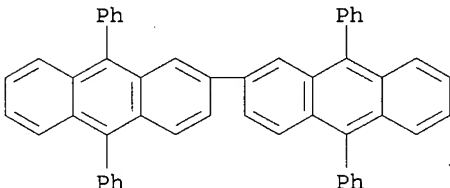
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WO 2000005927	A1	20000203	WO 1999-JP3810	19990715
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RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE				
JP 2000100566	A2	20000407	JP 1999-65090	19990311
JP 3357857	B2	20021216		
JP 2002260860	A2	20020913	JP 2001-375155	19990311
CA 2304585	AA	20000203	CA 1999-2304585	19990715
EP 1033904	A1	20000906	EP 1999-929843	19990715
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
TW 432892	B	20010501	TW 1999-88112408	19990721
US 6531234	B1	20030311	US 2000-508663	20000322
PRIORITY APPLN. INFO.:				
			JP 1998-209748	A 19980724
			JP 1999-65090	A 19990311
			WO 1999-JP3810	W 19990715

AB The invention relates to an org. electroluminescent device comprising a specific org. compd. having anthracene, naphthacene, pyrene, and perylene skeletons, wherein the mass spectrum of the specific org. compd. satisfies .SIGMA.(Isn)/IM .ltoreq. 0.25 for insuring the longevity of the device, wherein Isn and Im are the intensity of nth subpeak and that of the main peak, resp.

IT 172285-72-2 177799-11-0
(org. electroluminescence device)

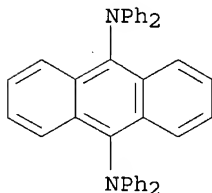
RN 172285-72-2 ZCAPLUS

CN 2,2'-Bianthracene, 9,9',10,10'-tetraphenyl- (9CI) (CA INDEX NAME)



RN 177799-11-0 ZCAPLUS

CN 9,10-Anthracenediamine, N,N,N',N'-tetraphenyl- (9CI) (CA INDEX NAME)



IT 172285-72-2 177799-11-0

(org. electroluminescence device)

REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L22 ANSWER 5 OF 6 ZCAPLUS COPYRIGHT 2003 ACS

ACCESSION NUMBER: 1999:260962 ZCAPLUS

DOCUMENT NUMBER: 130:344892

TITLE: Organic electroluminescent material containing anthracene derivative and organic electroluminescent device with it

INVENTOR(S): Tamano, Michiko; Maki, Shinichiro; Onikubo, Shunichi; Okutsu, Satoshi; Enokida, Toshio

PATENT ASSIGNEE(S): Toyo Ink Mfg. Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 22 pp.

CODEN: JKXXAF

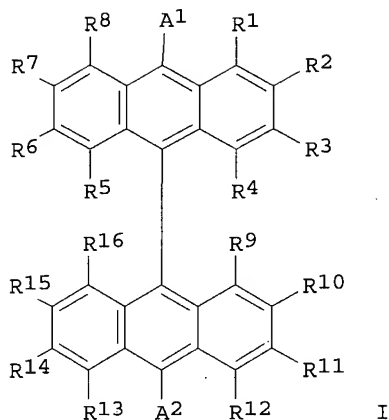
DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 11111458	A2	19990423	JP 1997-264468	19970929
PRIORITY APPLN. INFO.:			JP 1997-264468	19970929
OTHER SOURCE(S):		MARPAT 130:344892		
GI				



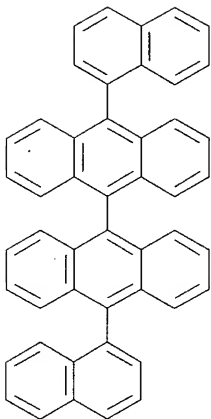
AB The material comprises an anthracene deriv. having a formula I (A1, 2 = alkyl, alkoxy, aryloxy, condensed polycyclic, alkylamino, arylamino; R1-16 = H, halogen, cyano, NO₂, alkyl, alkoxy, aryloxy, alkylthio, arylthio, cyclic group, NH₂; R1-16 may bond to form a ring). The device has a light-emitting layer-contg. plural org. compd. thin films sandwiched between a pair of electrodes, at least one of the films contains the material. The device shows high luminance with efficiency and long life.

IT 120335-70-8 223735-59-9 223735-60-2
223735-61-3 224051-93-8, 9,9':10',9'':10'',9''':10'''-
Quateranthracene

(light-emitting material contg. anthracene deriv. for electroluminescent device)

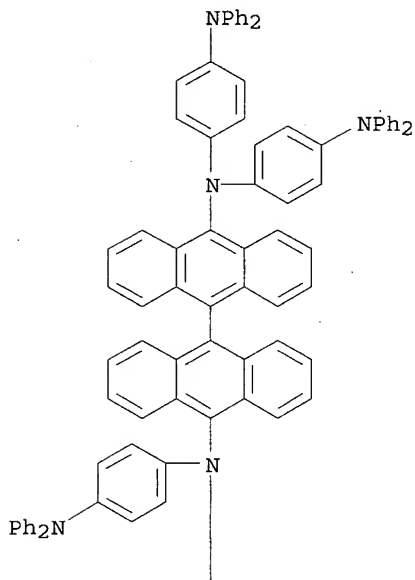
RN 120335-70-8 ZCAPLUS

CN 9,9'-Bianthracene, 10,10'-di-1-naphthalenyl- (9CI) (CA INDEX NAME)

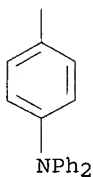


RN 223735-59-9 ZCAPLUS
CN [9,9'-Bianthracene]-10,10'-diamine, N,N,N',N'-tetrakis[4-(diphenylamino)phenyl]- (9CI) (CA INDEX NAME)

PAGE 1-A

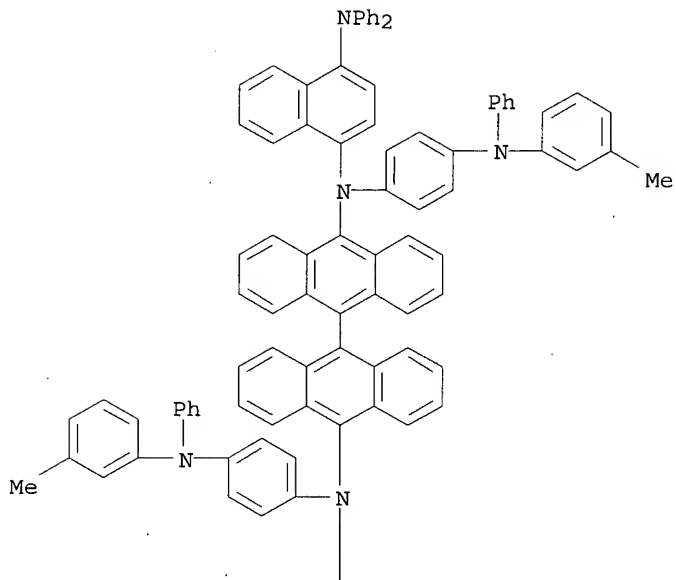


PAGE 2-A

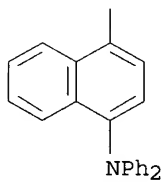


RN 223735-60-2 ZCAPLUS
 CN [9,9'-Bianthracene]-10,10'-diamine, N,N'-bis[4-(diphenylamino)-1-naphthalenyl]-N,N'-bis[4-[(3-methylphenyl)phenylamino]phenyl]- (9CI)
 (CA INDEX NAME)

PAGE 1-A

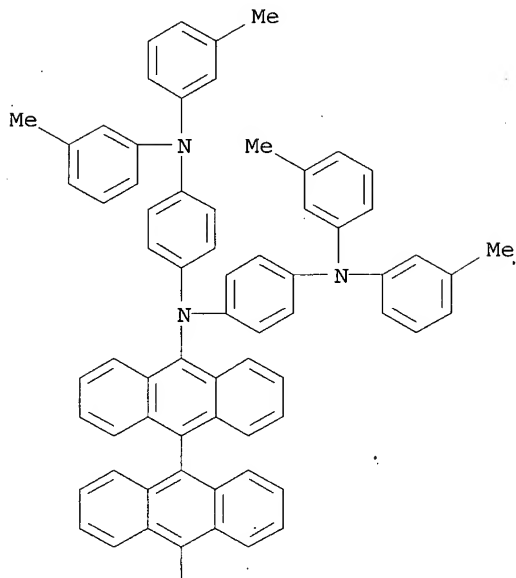


PAGE 2-A

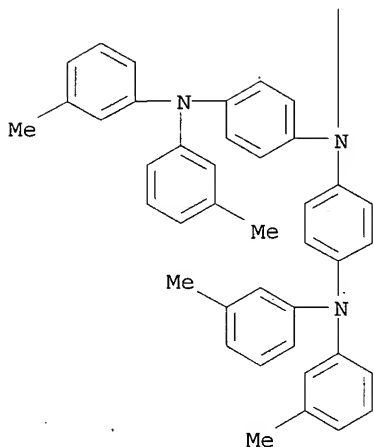


RN 223735-61-3 ZCAPLUS
 CN [9,9'-Bianthracene]-10,10'-diamine, N,N,N',N'-tetrakis[4-[bis(3-methylphenyl)amino]phenyl]- (9CI) (CA INDEX NAME)

PAGE 1-A

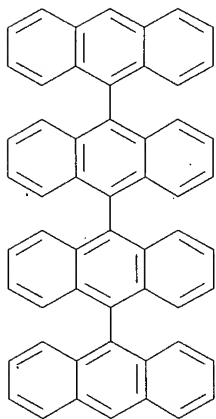


PAGE 2-A



RN 224051-93-8 ZCAPLUS

CN 9,9':10',9'':10'',9''':10''',9''''-Quateranthracene (9CI) (CA INDEX NAME)



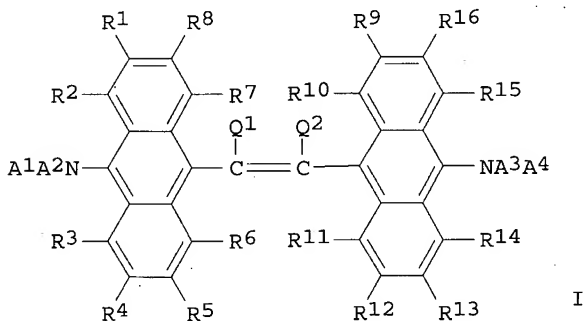
IT 120335-70-8 223735-59-9 223735-60-2
 223735-61-3 224051-93-8, 9,9':10',9'':10'',9''':10''',9''''-
 Quateranthracene

(light-emitting material contg. anthracene deriv. for
 electroluminescent device)

L22 ANSWER 6 OF 6 ZCAPLUS COPYRIGHT 2003 ACS
 ACCESSION NUMBER: 1999:35313 ZCAPLUS
 DOCUMENT NUMBER: 130:145976
 TITLE: Organic electroluminescent material containing anthracene derivative
 INVENTOR(S): Okutsu, Satoshi; Tamano, Michiko; Onikubo, Shunichi; Enokida, Toshio
 PATENT ASSIGNEE(S): Toyo Ink Mfg. Co., Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 36 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 11008068	A2	19990112	JP 1997-161418	19970618
PRIORITY APPLN. INFO.:			JP 1997-161418	19970618
OTHER SOURCE(S):		MARPAT 130:145976		

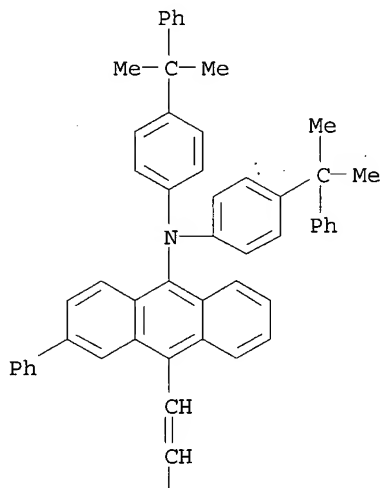
GI



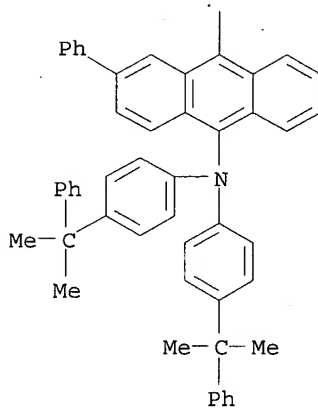
- AB The material, suited for use in an electroluminescent device, contains an anthracene deriv. I (A1-4 = alkyl, single ring, condensed ring; A1 and A2 and/or A3 and A4 may bond to form a condensed ring; Q1, 2 = H, cyano, alkyl, single ring, condensed ring; R1-16 = H, halogen, cyano, NO2, alkyl, alkoxy, aryloxy, alkylthio, arylthio, single ring, condensed ring, NH2, alkylamino, arylamino). The device shows high luminance and efficiency.
- IT 220072-01-5 220072-09-3
 (org. electroluminescent device contg. anthracene deriv.)

RN 220072-01-5 ZCAPLUS
CN 9-Anthracenamine, 10,10'-(1,2-ethenediyl)bis[N,N-bis[4-(1-methyl-1-phenylethyl)phenyl]-3-phenyl- (9CI) (CA INDEX NAME)

PAGE 1-A



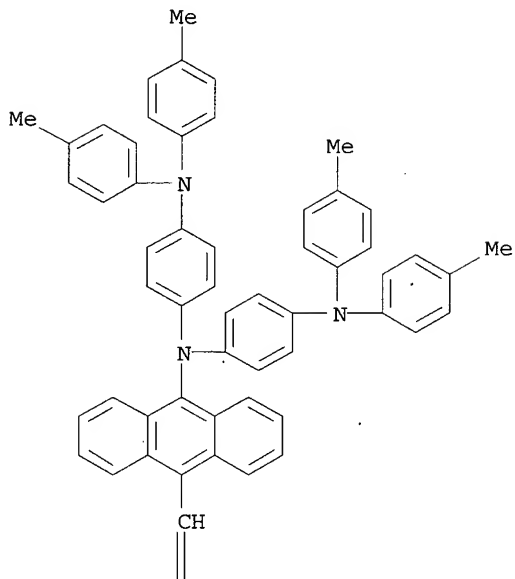
PAGE 2-A



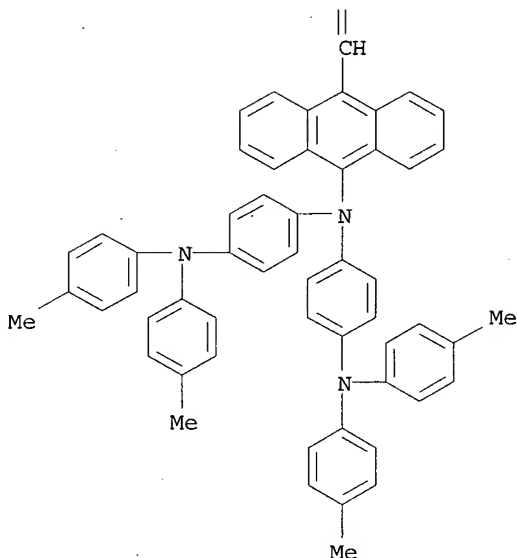
RN 220072-09-3 ZCAPLUS

CN 1,4-Benzenediamine, N,N'-(1,2-ethenediyl)-10,9-anthracenediylbis[N-[4-[bis(4-methylphenyl)amino]phenyl]-N',N'-bis(4-methylphenyl)]-(9CI) (CA INDEX NAME)

PAGE 1-A



PAGE 2-A



IT 220072-01-5 220072-09-3
(org. electroluminescent device contg. anthracene deriv.)

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L23 ANSWER 1 OF 1 ZCAPLUS COPYRIGHT 2003 ACS

2001:472850 Document No. 135:84034 Thin film electroluminescent devices. Satou, Tetsuya; Matsuo, Mikiko; Sugiura, Hisanori; Hisada, Hitoshi; Shingae, Ryuichi; Murakami, Yoshinobu (Matsushita Electric Industrial Co., Ltd., Japan). PCT Int. Appl. WO 2001046335 A1 20010628, 86 pp. DESIGNATED STATES: W: KR, US; RW: AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR. (Japanese). CODEN: PIXXD2. APPLICATION: WO 2000-JP9064 20001220. PRIORITY: JP 1999-360247 19991220; JP 2000-162031 20000531.

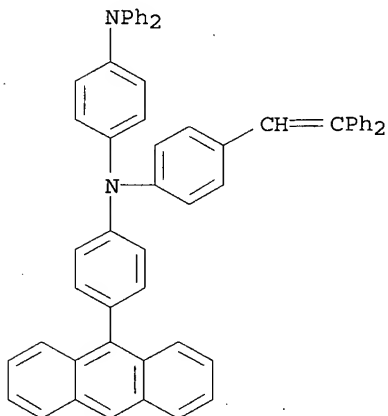
AB An electroluminescent device with a high luminous efficiency, a low drive voltage and a long life is presented. The luminescent layer of the thin film EL device is made of a charge transfer luminescent material whose mol. has a part contributing to charge transfer and a part where at least 2 mol. orbits contributing to radiative transition are localized and which contributes to emission.

IT 346610-47-7 346610-48-8 346610-49-9
346610-50-2 346610-51-3 346610-52-4
346610-53-5 346610-54-6 346610-55-7

346610-56-8 346610-57-9 346610-58-0
 346610-59-1 346610-60-4 346610-61-5
 346610-62-6 346610-64-8 346610-65-9
 (thin film electroluminescent devices)

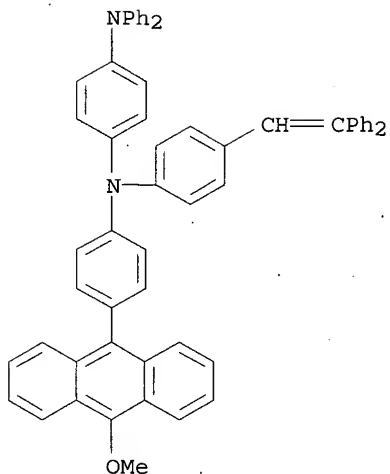
RN 346610-47-7 ZCAPLUS

CN 1,4-Benzenediamine, N-[4-(9-anthracenyl)phenyl]-N-[4-(2,2-diphenylethenyl)phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME)



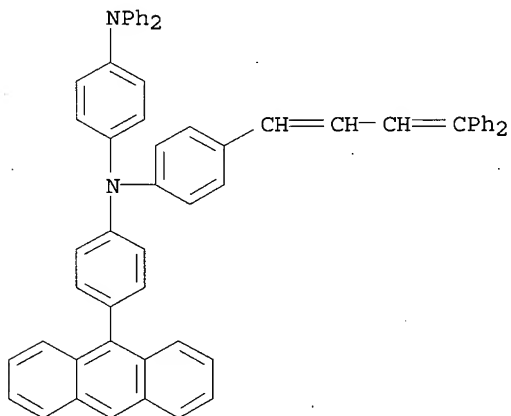
RN 346610-48-8 ZCAPLUS

CN 1,4-Benzenediamine, N-[4-(2,2-diphenylethenyl)phenyl]-N-[4-(10-methoxy-9-anthracenyl)phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME)



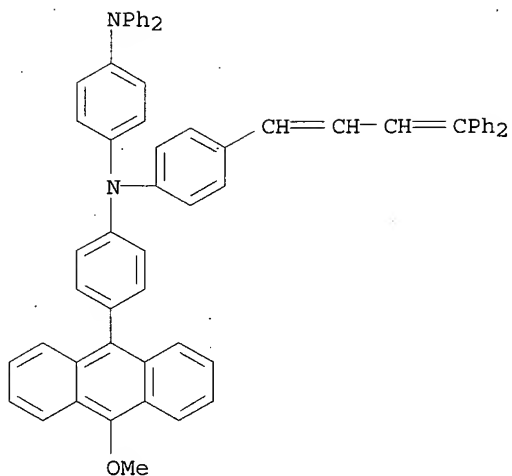
RN 346610-49-9 ZCAPLUS

CN 1,4-Benzenediamine, N-[4-(9-anthracenyl)phenyl]-N-[4-(4,4-diphenyl-1,3-butadienyl)phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME)

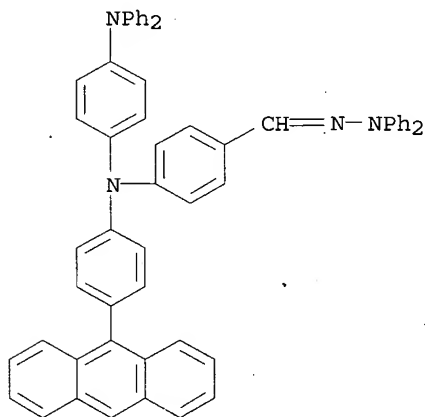


RN 346610-50-2 ZCAPLUS

CN 1,4-Benzenediamine, N-[4-(4,4-diphenyl-1,3-butadienyl)phenyl]-N-[4-(10-methoxy-9-anthracenyl)phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME)

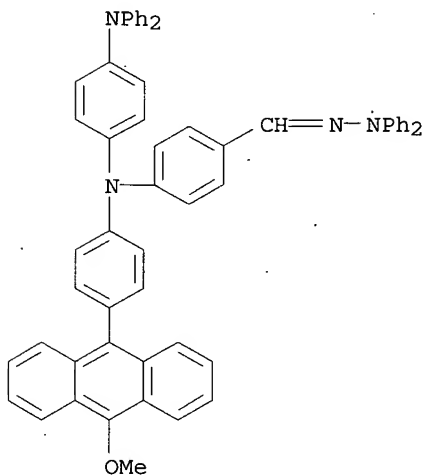


RN 346610-51-3 ZCAPLUS
CN Benzaldehyde, 4-[[4-(9-anthracenyl)phenyl][4-(diphenylamino)phenyl]amino]-, diphenylhydrazone (9CI) (CA INDEX NAME)



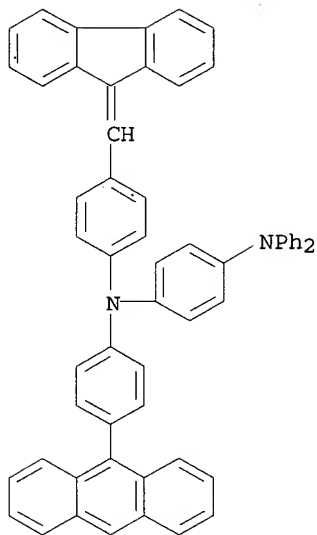
RN 346610-52-4 ZCAPLUS
CN Benzaldehyde, 4-[[4-(diphenylamino)phenyl][4-(10-methoxy-9-

anthracenyl)phenyl]amino]-, diphenylhydrazone (9CI) (CA INDEX NAME)



RN 346610-53-5 ZCAPLUS

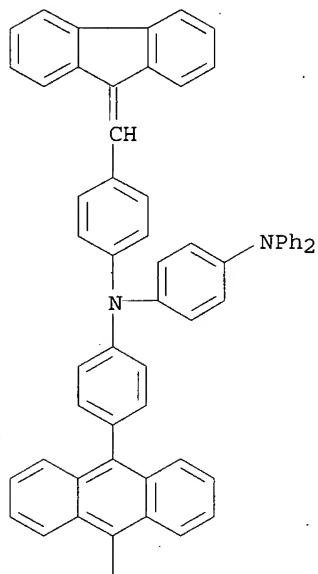
CN 1,4-Benzenediamine, N-[4-(9-anthracenyl)phenyl]-N-[4-(9H-fluoren-9-ylidenemethyl)phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME).



RN 346610-54-6 ZCAPLUS

CN 1,4-Benzenediamine, N-[4-(9H-fluoren-9-ylidenemethyl)phenyl]-N-[4-(10-methoxy-9-anthracenyl)phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME)

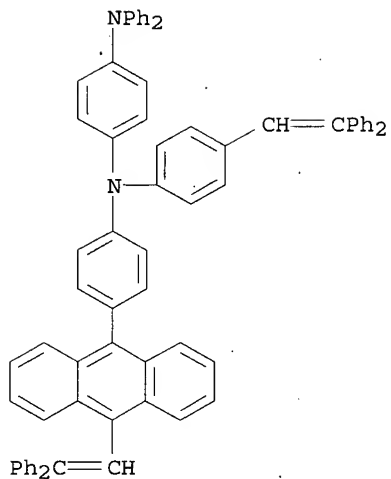
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PAGE 2-A

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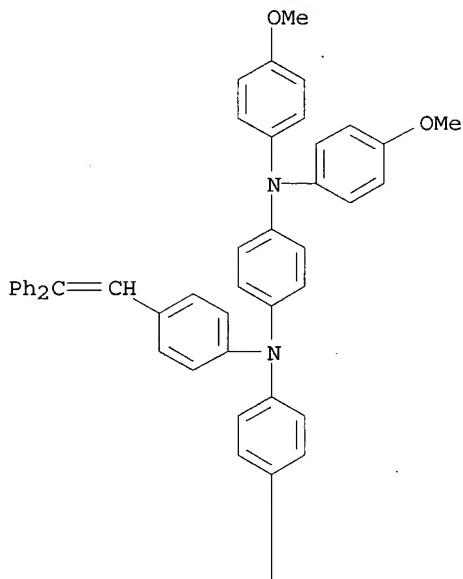
RN 346610-55-7 ZCAPLUS
 CN 1,4-Benzenediamine, N-[4-[10-(2,2-diphenylethenyl)-9-anthracenyl]phenyl]-N-[4-(2,2-diphenylethenyl)phenyl]-N',N'-diphenyl-(9CI) (CA INDEX NAME)



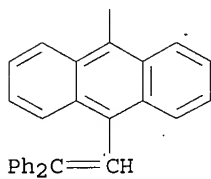
RN 346610-56-8 ZCAPLUS

CN 1,4-Benzenediamine, N-[4-[10-(2,2-diphenylethenyl)-9-anthracenyl]phenyl]-N-[4-(2,2-diphenylethenyl)phenyl]-N',N'-bis(4-methoxyphenyl)- (9CI) (CA INDEX NAME)

PAGE 1-A

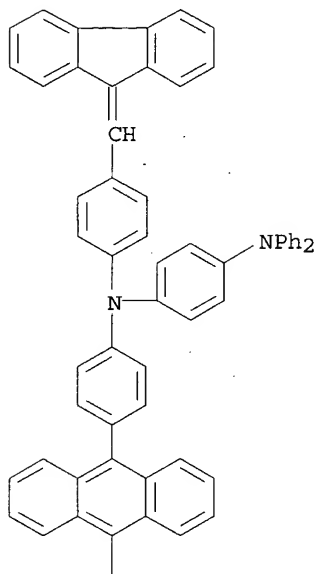


PAGE 2-A

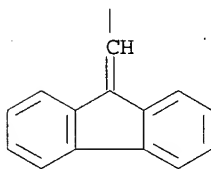


RN 346610-57-9 ZCAPLUS
CN 1,4-Benzenediamine, N-[4-[10-(9H-fluoren-9-ylidenemethyl)-9-anthracenyl]phenyl]-N-[4-(9H-fluoren-9-ylidenemethyl)phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME)

PAGE 1-A

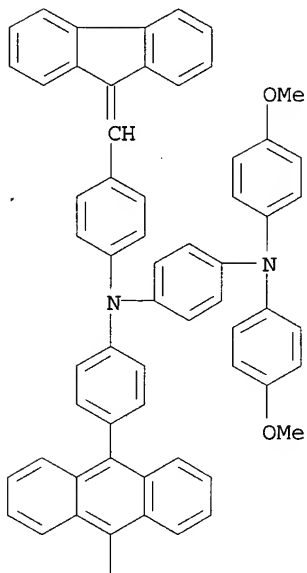


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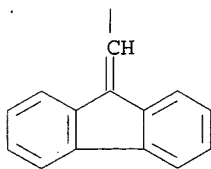


RN 346610-58-0 ZCAPLUS
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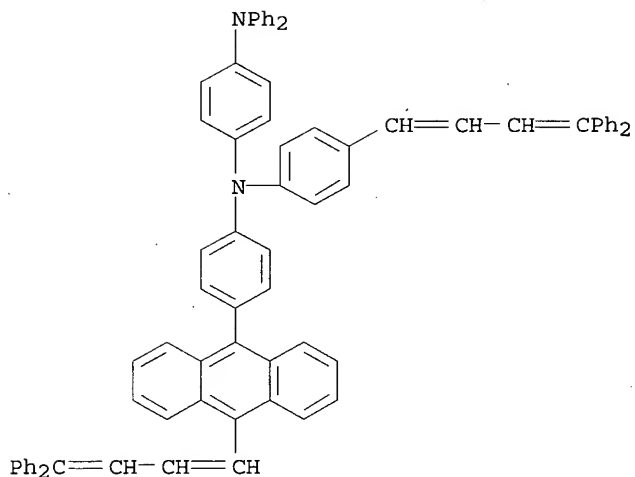
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PAGE 2-A



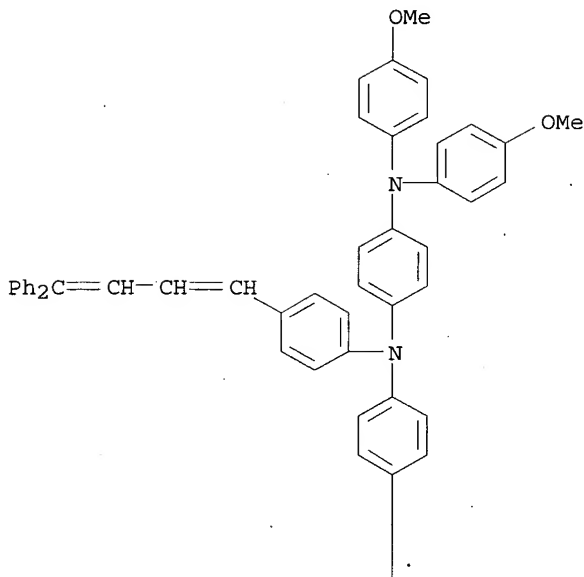
RN 346610-59-1 ZCAPLUS
 CN 1,4-Benzenediamine, N-[4-[10-(4,4-diphenyl-1,3-butadienyl)-9-anthracenyl]phenyl]-N-[4-(4,4-diphenyl-1,3-butadienyl)phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME)



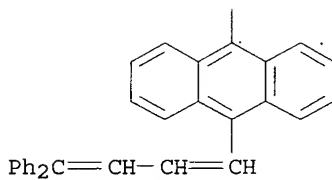
RN 346610-60-4 ZCAPLUS

CN 1,4-Benzenediamine, N-[4-[10-(4,4-diphenyl-1,3-butadienyl)-9-anthracenyl]phenyl]-N-[4-(4,4-diphenyl-1,3-butadienyl)phenyl]-N',N'-bis(4-methoxyphenyl)- (9CI) (CA INDEX NAME)

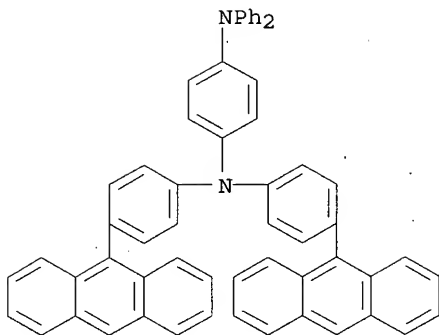
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PAGE 2-A

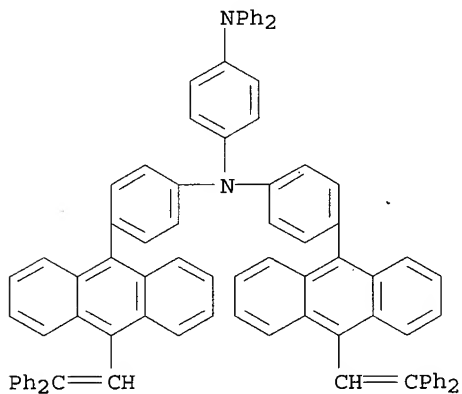


RN 346610-61-5 ZCAPLUS
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(9CI) (CA INDEX NAME)



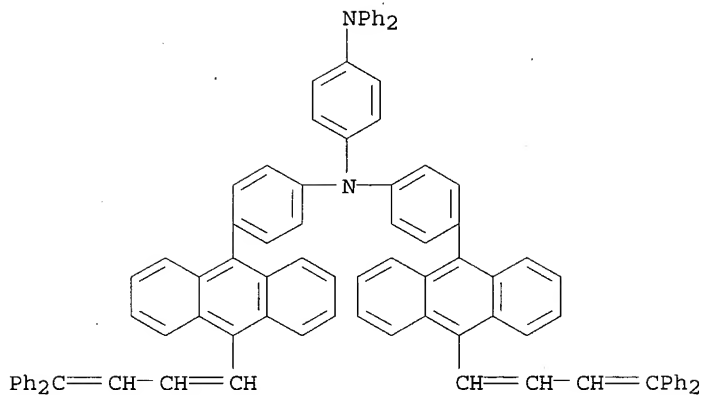
RN 346610-62-6 ZCAPLUS

CN 1,4-Benzenediamine, N,N-bis[4-[10-(2,2-diphenylethenyl)-9-anthracenyl]phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME)



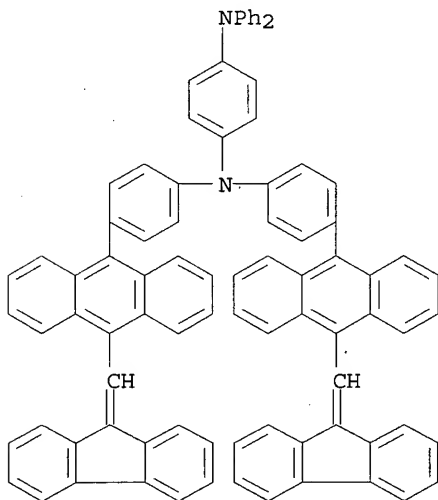
RN 346610-64-8 ZCAPLUS

CN 1,4-Benzenediamine, N,N-bis[4-[10-(4,4-diphenyl-1,3-butadienyl)-9-anthracenyl]phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME)



RN 346610-65-9 ZCAPLUS

CN 1,4-Benzenediamine, N,N-bis[4-[10-(9H-fluoren-9-ylidenemethyl)-9-anthracenyl]phenyl]-N',N'-diphenyl- (9CI) (CA INDEX NAME)



IT 346610-47-7 346610-48-8 346610-49-9
 346610-50-2 346610-51-3 346610-52-4
 346610-53-5 346610-54-6 346610-55-7
 346610-56-8 346610-57-9 346610-58-0